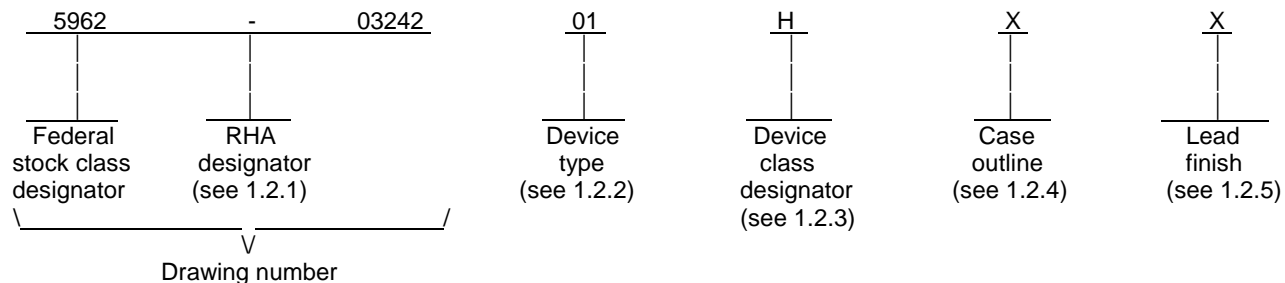


REVISIONS																			
LTR	DESCRIPTION										DATE (YR-MO-DA)				APPROVED				
A	Table I; Made correction to the switching frequency test to change the min limit from 400 kHz to 350 kHz. Remove the letter "B" in the suffix of the vendor similar PIN. Editorial changes throughout. -sld										04-04-19				Raymond Monnin				
REV																			
SHEET																			
REV																			
SHEET																			
REV STATUS OF SHEETS				REV		A	A	A	A	A	A	A	A	A	A	A	A		
				SHEET		1	2	3	4	5	6	7	8	9	10	11	12		
PMIC N/A				PREPARED BY Steve L. Duncan						<b>DEFENSE SUPPLY CENTER COLUMBUS</b> <b>COLUMBUS, OHIO 43216</b> <a href="http://www.dscc.dla.mil">http://www.dscc.dla.mil</a>									
<b>STANDARD MICROCIRCUIT DRAWING</b>  THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE  AMSC N/A				CHECKED BY Greg Cecil															
				APPROVED BY Raymond Monnin						<b>MICROCIRCUIT, HYBRID, LINEAR, DUAL CHANNEL, DC-DC CONVERTER</b>									
				DRAWING APPROVAL DATE 03-07-10															
				REVISION LEVEL A						SIZE A	CAGE CODE 67268	5962-03242							
						SHEET 1 OF 12													

## 1. SCOPE

1.1 Scope. This drawing documents five product assurance classes as defined in paragraph 1.2.3 and MIL-PRF-38534. A choice of case outlines and lead finishes which are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of radiation hardness assurance levels are reflected in the PIN.

1.2 PIN. The PIN shall be as shown in the following example:



1.2.1 Radiation hardness assurance (RHA) designator. RHA marked devices shall meet the MIL-PRF-38534 specified RHA levels and shall be marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

1.2.2 Device type(s). The device type(s) identify the circuit function as follows:

Device type	Generic number	Circuit function
01	DVSA2805D/H	DC-DC Converter, 5 W, $\pm 5$ V Outputs
02	DVSA2812D/H	DC-DC Converter, 6 W, $\pm 12$ V Outputs
03	DVSA2815D/H	DC-DC Converter, 6 W, $\pm 15$ V Outputs

1.2.3 Device class designator. This device class designator shall be a single letter identifying the product assurance level. All levels are defined by the requirements of MIL-PRF-38534 and require QML Certification as well as qualification (Class H, K, and E) or QML Listing (Class G and D). The product assurance levels are as follows:

Device class	Device performance documentation
K	Highest reliability class available. This level is intended for use in space applications.
H	Standard military quality class level. This level is intended for use in applications where non-space high reliability devices are required.
G	Reduced testing version of the standard military quality class. This level uses the Class H screening and In-Process Inspections with a possible limited temperature range, manufacturer specified incoming flow, and the manufacturer guarantees (but may not test) periodic and conformance inspections (Group A, B, C and D).
E	Designates devices which are based upon one of the other classes (K, H, or G) with exception(s) taken to the requirements of that class. These exception(s) must be specified in the device acquisition document; therefore the acquisition document should be reviewed to ensure that the exception(s) taken will not adversely affect system performance.
D	Manufacturer specified quality class. Quality level is defined by the manufacturers internal, QML certified flow. This product may have a limited temperature range.

STANDARD MICROCIRCUIT DRAWING  DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-03242
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1.2.4 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
X	See figure 1	8	Dual-in-line

1.2.5 Lead finish. The lead finish shall be as specified in MIL-PRF-38534.

1.3 Absolute maximum ratings. 1/

Input Voltage (Continuous) .....	+50 V dc
Input Voltage (Transient, 1 second) .....	+80 V dc
Power Dissipation ( $P_D$ , Full Load, $T_{CASE} = +125^\circ\text{C}$ ).....	2.5 W
Output Power (Dependant on Output Voltage) .....	6 W
Junction Temperature Rise to Case .....	+10°C
Storage Temperature .....	-65°C to +150°C
Lead Solder Temperature (10 seconds) .....	+270°C

1.4 Recommended operating conditions.

Input Voltage Range .....	+15 V dc to +50 V dc
Case Operating Temperature Range ( $T_C$ ) .....	-55°C to +125°C

## 2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

### DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.

### DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard Microcircuits.  
MIL-STD-1835 - Interface Standard for Electronic Component Case Outlines.

### DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103 - List of Standard Microcircuit Drawings.  
MIL-HDBK-780 - Standard Microcircuit Drawings.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or [www.dodssp.daps.mil](http://www.dodssp.daps.mil) or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

1/ Stresses above the absolute maximum ratings may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

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### 3. REQUIREMENTS

3.1 Item requirements. The individual item performance requirements for device classes D, E, G, H, and K shall be in accordance with MIL-PRF-38534. Compliance with MIL-PRF-38534 shall include the performance of all tests herein or as designated in the device manufacturer's Quality Management (QM) plan or as designated for the applicable device class. The manufacturer may eliminate, modify or optimize the tests and inspections herein, however the performance requirements as defined in MIL-PRF-38534 shall be met for the applicable device class. In addition, the modification in the QM plan shall not affect the form, fit, or function of the device for the applicable device class.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38534 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.4 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full specified operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are defined in table I.

3.5 Marking of device(s). Marking of device(s) shall be in accordance with MIL-PRF-38534. The device shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's vendor similar PIN may also be marked.

3.6 Data. In addition to the general performance requirements of MIL-PRF-38534, the manufacturer of the device described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, for each device type listed herein. Also, the data should include a summary of all parameters manually tested, and for those which, if any, are guaranteed. This data shall be maintained under document revision level control by the manufacturer and be made available to the preparing activity (DSCC-VA) upon request.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to supply to this drawing. The certificate of compliance (original copy) submitted to DSCC-VA shall affirm that the manufacturer's product meets the performance requirements of MIL-PRF-38534 and herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38534 shall be provided with each lot of microcircuits delivered to this drawing.

### 4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38534 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/</u> -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = +28 V dc ± 5% Full Load unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output Voltage <u>1/</u>	+V <sub>OUT</sub>	I <sub>OUT</sub> = 0.7 A	1	01	4.95	5.05	V dc
			2,3		4.925	5.075	
		I <sub>OUT</sub> = 0.35 A	1	02	11.88	12.12	
			2,3		11.82	12.18	
		I <sub>OUT</sub> = 0.28 A	1	03	14.85	15.15	
			2,3		14.775	15.225	
	-V <sub>OUT</sub>	I <sub>OUT</sub> = 0.7 A	1	01	-4.8	-5.2	
			2,3		-4.75	-5.25	
		I <sub>OUT</sub> = 0.35 A	1	02	-11.8	-12.2	
			2,3		-11.52	-12.48	
		I <sub>OUT</sub> = 0.28 A	1	03	-14.8	-15.2	
			2,3		-14.4	-15.6	
Output Current <u>2/</u> <u>3/</u>	I <sub>OUT</sub>	±V <sub>OUT</sub> V <sub>IN</sub> = 15 V dc to 50 V dc	1,2,3	01		0.7	A
				02		0.35	
				03		0.28	
V <sub>OUT</sub> Ripple Voltage	V <sub>RIP</sub>	±V <sub>OUT</sub> BW = 20 Hz to 3 MHz	1,2,3	All		50	mVp-p
V <sub>OUT</sub> Line Regulation	V <sub>RLINE</sub>	+V <sub>OUT</sub> V <sub>IN</sub> = 16 V dc to 40 V dc	1,2,3	All		20	mV
		-V <sub>OUT</sub> V <sub>IN</sub> = 16 V dc to 40 V dc				200	
V <sub>OUT</sub> Load Regulation	V <sub>RLOAD</sub>	+V <sub>OUT</sub> <u>1/</u> No Load to Full Load	1,2,3	All		50	mV
		-V <sub>OUT</sub> <u>1/</u> <u>4/</u> No Load to Full Load				200	
-V <sub>OUT</sub> Cross Regulation	-V <sub>RCRS</sub>	+Load 70%, -Load 30% +Load 30%, -Load 70%	1,2,3	All		450	mV

See footnotes at end of table.

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DEFENSE SUPPLY CENTER COLUMBUS  
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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions <u>1/</u> -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = +28 V dc ± 5% Full Load unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Input Current	I <sub>IN</sub>	I <sub>OUT</sub> = 0, Inhibit (pin 5) = 0	1,2,3	All		6	mA
		I <sub>OUT</sub> = 0, Inhibit (pin 5) = open				60	
I <sub>IN</sub> Ripple Current	I <sub>RIP</sub>	BW = 20 Hz to 10 MHz	1,2,3	All		50	mAp-p
Efficiency	Eff	I <sub>OUT</sub> = 0.7 A	1,2,3	01	66		%
		I <sub>OUT</sub> = 0.35 A		02	72		
		I <sub>OUT</sub> = 0.28 A		03	73		
Isolation	ISO	Input to output or any pin to case except the case ground (pin 8) at 500 V dc, T <sub>c</sub> = +25°C	1	All	100		MΩ
Capacitive Load <u>5/ 6/</u>	C <sub>L</sub>	±V <sub>OUT</sub> No effect on DC performance, T <sub>c</sub> = +25°C	1	All		500	μF
Short Circuit Power Dissipation	P <sub>D</sub>	Short Circuit	1,2,3	All		3	W
Switching Frequency	F <sub>S</sub>		1,2,3	All	350	500	kHz
V <sub>OUT</sub> Step Load Transient <u>7/</u>	V <sub>TLOAD</sub>	±V <sub>OUT</sub> 50% Load to 100% Load Opposite output at 50% Load.	4,5,6	All		300	mV pk
V <sub>OUT</sub> Step Load Transient Recovery <u>7/ 8/</u>	T <sub>TLOAD</sub>	±V <sub>OUT</sub> 50% Load to 100% Load Opposite output at 50% Load.	4,5,6	01		400	μs
				02		450	
				03		500	
V <sub>OUT</sub> Step Line Transient <u>6/</u>	V <sub>TLINE</sub>	±V <sub>OUT</sub> V <sub>IN</sub> = 16 V dc to 40 V dc	4,5,6	01		1000	mV pk
				02,03		1200	
V <sub>OUT</sub> Step Line Transient Recovery <u>6/ 8/</u>	T <sub>TLINE</sub>	±V <sub>OUT</sub> V <sub>IN</sub> = 16 V dc to 40 V dc	4,5,6	01		700	μs
				02,03		500	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions <u>1/</u> -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = +28 V dc ± 5% Full Load unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Start Up Overshoot <u>7/</u> <u>9/</u>	V <sub>tonOS</sub>	±V <sub>OUT</sub> V <sub>IN</sub> = 0 V dc to 28 V dc	4,5,6	01		25	mV pk
				02,03		50	
Start Up Delay <u>7/</u> <u>10/</u>	T <sub>onD</sub>	±V <sub>OUT</sub> V <sub>IN</sub> = 0 V dc to 28 V dc	4,5,6	All		20	ms

1/ Half load at +V<sub>OUT</sub> and half load at -V<sub>OUT</sub>.

2/ Derate linearly to 0 at 135°C.

3/ Up to 70 percent of the total power or current can be drawn from any one of the two outputs.

4/ 5 percent load to full load at -55°C.

5/ Capacitive load may be any value from 0 to the maximum limit without compromising dc performance.

6/ Parameter shall be tested as part of device characterization and after design and process changes. Thereafter, parameters shall be guaranteed to the limits specified in table I.

7/ Subgroups 5 and 6 parameters shall be tested as part of device characterization and after design and process changes. Thereafter, parameters shall be guaranteed to the limits specified in table I.

8/ Recovery time is measured from the initiation of the transient until V<sub>OUT</sub> has returned to within ±1 percent of V<sub>OUT</sub> final value.

9/ Time for V<sub>OUT</sub> to settle within ±1 percent of its final value.

10/ Start up delay time measurement is either for a step application of power at the input or the removal of a ground signal from the inhibit pin (pin 5) while power is applied to the input.

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Case outline X.

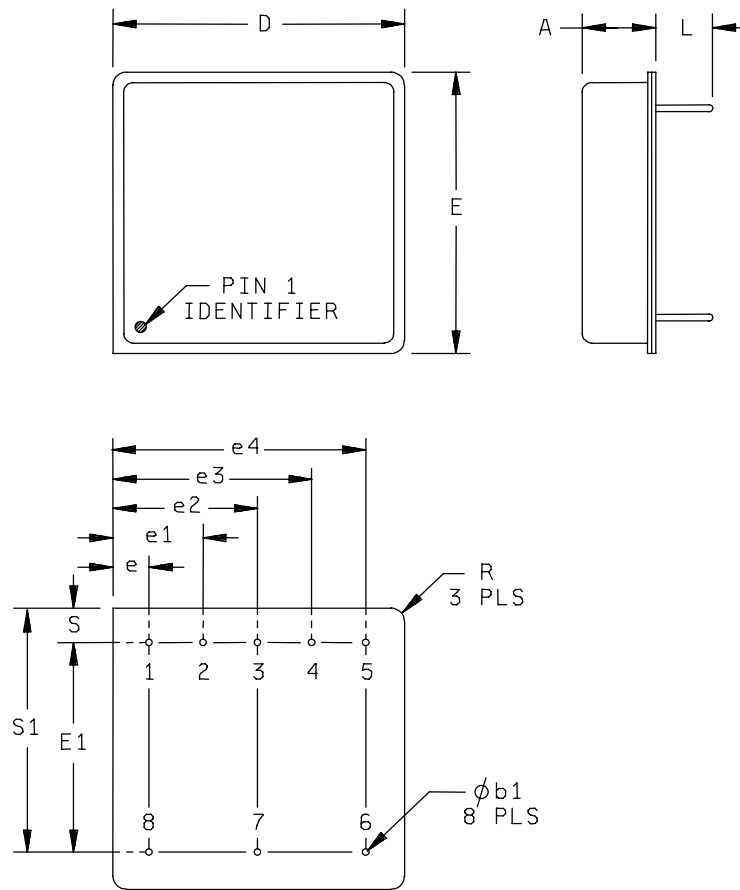


FIGURE 1. Case outline.

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Case outline X - Continued.

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A		6.86		.270
Øb1	0.64 DIA		.025 DIA	
D/E		27.31		1.075
E1	20.19	20.45	.795	.805
e/S	3.23	3.48	.127	.137
e1	8.31	8.56	.327	.337
e2	13.39	13.64	.527	.537
e3	18.47	18.72	.727	.737
e4/S1	23.55	23.80	.927	.937
L	4.83	5.33	.190	.210
R	1.14	1.40	.045	.055

NOTES:

1. The U. S. Government preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall take precedence.
2. Pin numbers are for reference only.
3. Case outline X weight: 15 grams maximum.

FIGURE 1. Case outline - Continued.

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Device types	All
Case outlines	X
Terminal number	Terminal symbol
1	Positive Output
2	Output return
3	Negative Output
4	No connection
5	Inhibit
6	Input
7	Input return
8	Case ground

FIGURE 2. Terminal connections.

<b>STANDARD MICROCIRCUIT DRAWING</b>  DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE <b>A</b>		<b>5962-03242</b>
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TABLE II. Electrical test requirements.

MIL-PRF-38534 test requirements	Subgroups (in accordance with MIL-PRF-38534, group A test table)
Interim electrical parameters	
Final electrical parameters	1*, 2, 3, 4
Group A test requirements	1, 2, 3, 4
Group C end-point electrical parameters	1, 2, 3, 4
End-point electrical parameters for Radiation Hardness Assurance (RHA) devices	Not applicable

\* PDA applies to subgroup 1.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1015 of MIL-STD-883.

(2)  $T_A$  as specified in accordance with table I of method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Conformance and periodic inspections. Conformance inspection (CI) and periodic inspection (PI) shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection (CI). Group A inspection shall be in accordance with MIL-PRF-38534 and as follows:

a. Tests shall be as specified in table II herein.

b. Subgroups 5, 6, 7, 8, 9, 10, and 11 shall be omitted.

4.3.2 Group B inspection (PI). Group B inspection shall be in accordance with MIL-PRF-38534.

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4.3.3 Group C inspection (PI). Group C inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test, method 1005 of MIL-STD-883.
  - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1005 of MIL-STD-883.
  - (2)  $T_A$  as specified in accordance with table I of method 1005 of MIL-STD-883.
  - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.3.4 Group D inspection (PI). Group D inspection shall be in accordance with MIL-PRF-38534.

4.3.5 Radiation Hardness Assurance (RHA) inspection. RHA inspection is not currently applicable to this drawing.

## 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38534.

## 6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated as specified in MIL-PRF-38534.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus (DSCC) when a system application requires configuration control and the applicable SMD. DSCC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43216-5000, or telephone (614) 692-1081.

6.6 Sources of supply. Sources of supply are listed in MIL-HDBK-103 and QML-38534. The vendors listed in MIL-HDBK-103 and QML-38534 have submitted a certificate of compliance (see 3.7 herein) to DSCC-VA and have agreed to this drawing.

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## STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 04-04-19

Approved sources of supply for SMD 5962-03242 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38534 during the next revisions. MIL-HDBK-103 and QML-38534 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DSCC-VA. This information bulletin is superseded by the next dated revisions of MIL-HDBK-103 and QML-38534.

Standard microcircuit drawing PIN <u>1</u> /	Vendor CAGE number	Vendor similar PIN <u>2</u> /
5962-0324201HXC 5962-0324201HXA	0ZBZ6 0ZBZ6	DVSA2805D/H DVSA2805D/H-E
5962-0324202HXC 5962-0324202HXA	0ZBZ6 0ZBZ6	DVSA2812D/H DVSA2812D/H-E
5962-0324203HXC 5962-0324203HXA	0ZBZ6 0ZBZ6	DVSA2815D/H DVSA2815D/H-E

- 1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the Vendor to determine its availability.
- 2/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE  
number

0ZBZ6

Vendor name  
and address

VPT Incorporated  
2801 Commerce Street  
Blacksburg, VA 24060

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in the information bulletin.